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Park, Ji Yong (2011) Design education online : learning delivery and evaluation. *International Journal Of Art & Design Education*, *30*(2), pp. 22-33.

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# Design Education Online: Learning Delivery and Evaluation


## Abstract

Online learning has been recognised as an effective pedagogical method and tool, and is broadly integrated into various types of teaching and learning strategies in higher education. In practice, the use of Learning Management Systems (LMS) in higher education has become an integral strategy for quality education. The field of design education however has not been researched extensively in regard to online learning, delivery and evaluation. This paper discusses design education from an online learning perspective. It proposes an integrated framework with three key components for online learning via LMS (Blackboard) including an interactive delivery structure, communication channels, and learning evaluation. Additionally, the paper describes and evaluates how Blackboard sites for two design units (Design Perspectives and Digital Design and Communication) were built based on an integrated framework and student learning experiences. The paper proposes that online design education should be integrated with various educational values and functional features in a systematic manner, and requires designing learning evaluation protocols as part of learning activities and communicative forms within online-based learning sites.



**Keywords:** Blackboard-based learning, Learning Management Systems, Online design education, Virtual design studio, Design education,


## Introduction

Information and Communication Technologies (ICTs) play a large role in developing and delivering the learning content in higher education. , The current imperative is to

design curriculum and content within delivery formats in a pedagogically sound way and in a technologically effective manner. For many universities, a Learning Management System (LMS) such as Blackboard has been adopted that provides a variety of applications for online learning and its delivery. However, online-based learning in higher education is confronted with quality issues in terms of 'providing the best possible forms' (Oliver 2001, 223). Further, it is possible that the LMS can over-generalise disciplinary characteristics and restrict creativity and experimentation in terms of pedagogical development. Teachers may be compelled to use a LMS to deliver units with a predetermined structure that restricts desired learning outcomes. Regardless of teachers' capability to use LMS and institutionally organised training and professional development programs, customisation of the LMS for a program or a unit is to rely on individual teacher's desire or affordability. In particular LMS has not been used effectively and efficiently in those disciplines that require more practice-based learning and development such as in art and design. Art and design is a discipline characterised by professional practice and collaborative interactions between artefacts and design students (or artists). For example, the process of web site development normally produces a numbers of design artefacts such as drawings, storyboard, digital images, photography, typography, programming language, and server sided technology. For art and design teachers and students the development process has traditionally relied on face-to-face communication and collaboration with limited interaction with online-based fora. An LMS structure and format is considered good enough to deliver some materials, but it cannot cater for art and design education because it does not reflect the specific demands and characteristics of the discipline. Therefore, extensive system redesign and manipulation are required to address these concerns and in particular provide quality interactive learning experiences.

The main argument of this paper therefore is that interactive learning experiences in online learning requires developing greater interactivity in order to achieve desired learning objectives. From a design studies perspective, Smith, Hedley and Molloy (2009, 14) identified two key aspects of learning experiences in design studies; 'the first is learning *how to design* by engagement with a process of designing or a suite of possible design methodologies. The second is to reveal knowledge about concepts and/or situations *through the act* of designing'. Central to both aspects is active participation and engagement by the learner. Therefore an online learning process needs to be articulated and structured within such a dynamic context. The paper will first discuss the characteristics of design education, online learning, and Blackboard, and then suggest an integrated framework of design education online using three key components of LMS: delivery structure, communication, and evaluation.

**Design education and its characteristics**

The design studio is the central mode of teaching art and design today. This context has not significantly changed from its historical roots in models such as Ecole Des Beaux Arts (1819 – 1914) and Bauhaus (1919 – 1932) (Broadfoot & Bennett 2003). Essentially it remains a shared place in which students are given practical tasks and projects to solve either individually or collaboratively and where students share their solutions or development processes with other students. Students and teacher in this space interact with each other based on traditional principles of supervision, consultation, and discussion. 'Reflective practice,' a term coined by Schön (1983), is a key component of this kind of design education because it is 'a dialogue of thinking and doing through which [students] become more skilled' (1987, 31). Reflective

practice is a mode of working and learning in ongoing professional development that consists of ‘reflection-in-action’ (Schön 1983) through which ‘a practitioner reconstructs an experience in writing, considers its meaning, identifies actions and carries them out’ (Bell & Gillett 2002).

Design education is also characterised its authentic problem- , task-, and project- based learning. Project-based learning is considered ‘a common feature in practice-base design education’ where it is ‘rarely defined in practical curriculum development terms’ (Lee 2009). A problem, task, or project allows students to assess their learning and creates a bridge between what students have learned and how it can be used in practice. Design cannot be taught in the abstract only, but knowledge and skills can be shaped through the visualisation of process and participation in development. Design students learn design through a convergent or multi-discipline mode that enables them to approach the design work at different levels and with an emphasis on different aspects (Visser 2008).

Design learning requires iterative meaningful practice for gaining proficiency and expertise. It is usual that the design teacher or practitioner is required to demonstrate relevant techniques and skills, and assist students individually or in groups through repetitive instructions and applied skills. Such demonstrations accompany regular communication, both formal and informal, to improve the effectiveness of skills and knowledge acquisition. In terms of problem-based learning, regular communication and demonstration allow students to holistically approach the problem or task through their integration of societal values and design elements (Waks 2001). Therefore, this style of practical, sometimes referred to as apprentice and professional, results in a dynamic learning environment (Broadfoot & Bennett 2003; Park 2008b). In the open space of the design, the integration of tacit knowledge,

practical skills, and theoretical background is facilitated.

**Design education and ICT**

Many researchers have shown that online delivery can generate creativity, high order thinking, reflection in action and design skill proficiency and even enhance these educational values through active and engaging learning experiences (Broadfoot & Bennett 2003; Waks 2001). Furthermore, it has been argued that ICT enhances problem- and task-based learning to be more communicative and interactive, so the spatio-temporal restrictions restraints of face-to-face learning can be overcome (Liegel 2004; Elliott 2003). This produces various learning modes such as blended, interactive, and innovative learning models. Additionally this form of learning has been argued to allow students the opportunity to learn according to their preferred learning styles, and they become more self-directed and responsible for their learning (Green et al. 2006; Gulc 2006). In other words, ICT approaches allow the opportunity for new forms of of interactions that are flexible, personalisable, and customisable (Green et al. 2006; Gulc 2006).

Although ICT has advanced sufficiently to enable educators to embody many features of face-to-face learning in an online learning environment, researchers continue to argue that it still has restrictions in being functionally capable of replacing face-to-face learning (Clark 2003; Ho 2002; Quinsee & Hurst 2004). For example, the design teachers' demonstrations of a development process of a particular product or technique may be limited to real-time delivery and interaction due to technical limitations such as bandwidth limitations and content formats for Internet browsers (James 2004; Clark 2003). Students may also have the same difficulty in sharing their learning with other students. Therefore, ICT-based learning environments need to be

customised for the various learning styles and modes, particularly focusing on the communication efficiency as well as learners' participation and engagement, and it also needs to improve technical limitations in order to reflect characteristics of a discipline and achieve relevant educational values.

**ICT-based learning and learning constituents**

Education researchers have argued that values of learning have shifted from modernism to post-modernism (Peters 1998; Saba 2005). They argue that post-modern ideas and ICT have influenced curriculum design and delivery and the development of any new learning model requires going through a process of understanding learners. This entails scrutinising learning patterns in the online environment and researching how to maximise the effectiveness of learning with communication and multimedia tools. Higher education maintains vestiges of its historical antecedences with aspects of pre-modern, modern, and post-modern practice (Peters 1998; Saba 2005). Therefore it is vital for ICT-based learning design to understand and define the learning constituents in terms of a highly interactive and effective online learning environment. Poster (2006) maintains that the key constituents of higher education are the student, the teacher and the content. These three constituents, along with the deeply embedded discourses of a 1200 year old institution are required to be understood when considering ICT-based learning design.

Traditionally students were perceived as knowledge receivers, content as deliverables, and teachers as didactic purveyors of information. The approaches to the constituents would restrict the ICT-based learning design in terms of flexibility and interactivity. As ICT and postmodern culture have changed the way in which people live and work, education constituents are now being considered from the perspective

of the online learning environment. In the online learning environment, students become '*interactive learning participants'* rather than knowledge receivers (Park 2008a; Park 2007). This has been affected by the features of the Internet and ICT such as synchronous (communication in a same time-different place mode) and asynchronous tool (communication in a different time-different place mode), manipulable and non-linear approaches to content, and networking with web sites.

The repositioning of teacher identity and roles is required to facilitate and support the students' active participation and engagement in their learning. This means designing learning content in terms of delivery formats that provide more productive and creative activities such as socially networked learning experiences. The interface where students and teacher meet, however, is a cyber space where learners are apt to lose interest in learning and potentially can fail their course (Abrahamson 1998; Wiesener 1983). This means that the teachers' capacity of facilitating and interacting with students, including the appropriateness of using multimedia for delivering and formatting learning content could determine the success of online learning.

As online learners become interactive learning participants, the teacher needs also to be an active participant and moderator whose skills and knowledge are able to guide or assist learners in the right direction maintaining a high quality of learning experience. To be an interactive learning participant, Alderman and Fletcher (2005) suggest that teachers need to visit the online learning environment regularly, responding to questions, suggesting different views and providing relevant information. Hallas (2005) also suggests that the teachers in the online learning environment need to carefully monitor students' activities and behaviours in terms of determining student needs. In these contexts, the teacher is transformed into an

'*interactive learning instructor'* who is able to manipulate learning content according to student needs and moderate the learning community for quality learning experiences (Park 2008a).

Finally, the learning content can be redefined to an interactive learning experience approach because interaction between learners and content becomes a critical component of the online learning mode (Moore & Kearsley 1996). When considering characteristics of online learning such as flexibility, accessibility and personalisation, the learning content and materials can be reformatted for an interactive method of delivery and communication. This form of content delivery can be understood as the '*interactive learning module*' (Park 2008a). And interactive learning module can be designed for its downloadability and learnability to maximise the flexibility of learning and to enhance interactivity. This approach supports learner-centred education where learners will be able to arrange the learning content and materials according to their learning styles and patterns.

**Learning Management System: Blackboard**

Blackboard is a flexible e-learning and online community system for delivering online courses and establishing online communities. Blackboard can be used either to enhance traditional class formats or deliver an entire course online. For example, asynchronous discussion boards are used as communication channels where learners can participate any time and from any place where they have access to Internet or intranet connectivity. The Blackboard Manual (2007) states that the instructor can use discussion boards to; continue class discussions outside of class; promote an online community; develop group or individual student facilitated discussions; post and discuss case studies; post student papers for peer evaluation and critique; post

homework questions; provide a public forum for students to post questions; provide a forum for a guest speaker ‘Q & A’; and create an online social forum for a course. There are also supplementary applications available such as grading, surveys, statistics and announcements that are useful in terms of enhancing and supporting interactive learning in Blackboard. The ability to arrange various applications and tools in Blackboard is vital for instructors to tailor the unit delivery and format according to the unit objectives.

**Interactive learning experience in the online design studio**

Therefore, the key imperatives in design education online are to create high-quality and interactive learning experiences in the online learning context and to define appropriate interactivity among the learning components. Conversely, the key impediments to performing high-level interactive learning and teaching are an ill-defined unit structure, poorly-designed communication channels and inappropriately formatted content. These impediments also articulate the necessity for redefining the learning constituents to enhance the success of online learning.

A Blackboard based design studio can be defined as ‘a networked design studio’ (Shao, Daley & Vaughan 2007, 918). A networked design studio is characterised by its ‘broadening time and space boundaries; designing and communicating with computer-mediated and computer-supported platforms; representing the process and outcomes with electronic forms; accessed through the Internet; providing asynchronous and synchronous communication; supervision by professional practitioners’ (Maher, Simoff & Cicognani 2006, 2; Shao, Daley & Vaughan 2007, 918). Because Blackboard provides many functions, applications and graphical interfaces, and allows the possibility of combinations of other media and

tools, defining a learning structure in the online design studio is truly building an interactive learning environment. Additionally it allows for the arrangement of learning content and setting up communication channels for support for interactive learning participants. Effective delivery of a design unit via Blackboard requires considering three main areas of learning site design: site structure and content format, communication channels and learning evaluation.

An interactive learning content format and delivery is required to be innovative and ground-breaking to facilitate learners' interactive activities. Blackboard offers forums such as blog (a combination of the words "web" and "log" that is a type of website maintained by an individual with regular entries), wiki (a website enabling documents to be written collaboratively, in a simple markup language using a web browser), and UCC (user-created content). For interactive communication in a virtual design studio, various communication tools including asynchronous and synchronous communication tools need to be arranged for creating a multi-channel of communication. For evaluation, Blackboard allows for the development of appropriate evaluation methods. However these need to be constructed based on the three redefined learning constituents.

**Framework of Blackboard-Based Design Learning**

Based on the above discussions about the characteristics of design education, the concept of interactive learning experience and the redefined learning constituents in terms of online-based design learning via Blackboard, the framework of design learning online through designing three key components (content structure, communication and evaluation) via Blackboard to fit into a design education will now be proposed

For the development of the framework, two graphic design units, Digital Design and Communication and Design Perspectives, were chosen, designed, and delivered via Blackboard. Both units were delivered through a fully online learning mode for distance education students and a blended learning mode for on-campus students. The units, provided sequential steps of visual and digital design learning, introduced students to the creative process of design and visual perception development. A key component of the two units was that the students had to develop and understanding of visual and digital design as a visual language that is based on fundamental design principles and elements and practical digital image productions. Assessments were weekly- projects which aimed to give students a way to experience and practice the process of digital visual design production in various formats through interactive communication channels via a mainly asynchronous discussion board. To successfully complete the assessments, students were encouraged to communicate via the discussion board with other students and the design teachers. This discussion centred on the process of design and presentation.

***- Interactive Learning Structure***

Multi-interactivity for an online learning environment requires a cognitive and explicit learning structure to convey continuous and interactive activities with learning components ranging from an individual approach to social interaction with other learners (Barab et al. 2001). The structure below has been developed based on the characteristics of design education and online learning when using Blackboard functionalities. Four elements were identified as the interactive learning elements of Blackboard based learning: unit information, learning content, interactive communication, and supplementary functions (Park 2008a). These elements need to

be systematically connected in terms of creating an interactive learning experience and effective communication between teacher and students and between students and students. It is recommended for teachers to recognise that Blackboard systems can be categorised with the interactive learning elements that must be designed by considering diverse variables such as characteristics of disciplinary education, specific objectives of the unit, learning contents and target learners' needs. Figure 1 below is a revised framework incorporating the Blackboard for design education delivery that presents possible functions and services of each element.

- Unit Information (UI): The UI outlines unit objectives and structure. It is vital that the element should be presented with a form of unambiguous and detailed timeline from the learners' study schedule and patterns. A flexible and comprehensive learning schedule may need to consider accommodating diverse student needs at different learning circumstances such as different age-levels and workload.
- Learning Content (LC): The LC provides interactive learning modules reshaping learning materials and resources in terms of interactive learning experience and proposed learning schedule in UI. It has to be developed by considering various media such as audio, video, and print, and its delivery form in terms of usability and accessibility that may affect learning activities in either positive or negative ways.
- Interactive Communication (IC): The IC is the area where communication and interaction takes place between students and students, and between students and teacher through various communication tools, asynchronous and synchronous. The asynchronous discussion board is the main communication

channel where most learning interactions take place, so it requires the development of its own framework.

- Supplementary Functions (SF): The SF such as assessment, survey, statistics and additional resources play an important role in making a unit site more functional and effective. In particular, the learning evaluation has to be deliberately set up to assure the learners participate in it as a part of their learning. Therefore, the learning evaluation also requires its own structure.

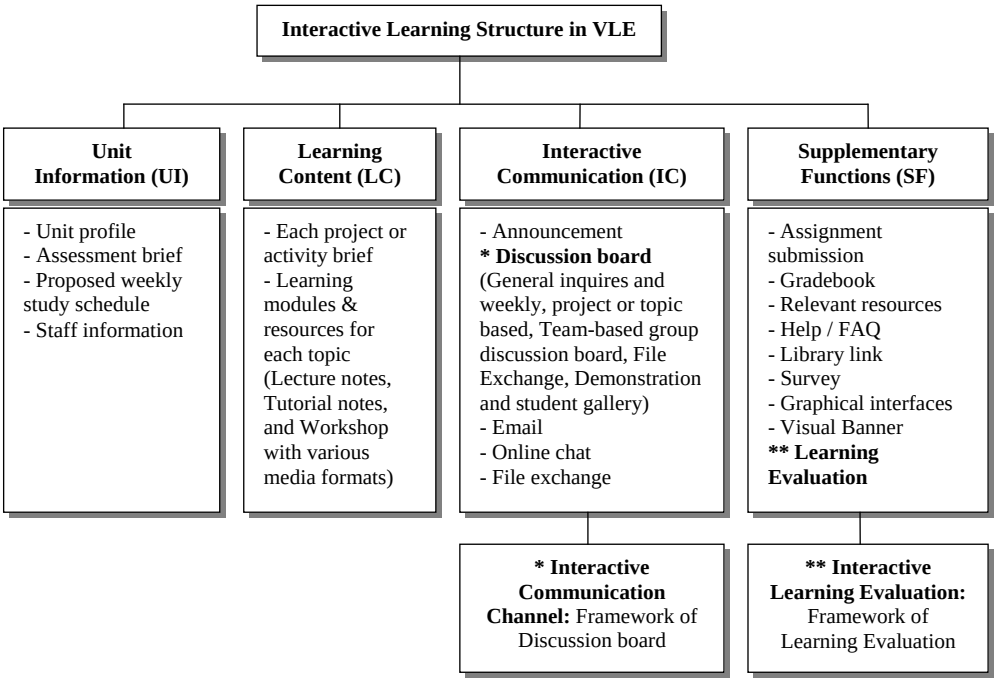


Figure1 Interactive Learning Structure in VLE (based on Park's 'Framework for online learning of visual design' (2008a))

***- Interactive Communication Structure***

The discussion board functions more than a communication tool because it is the area where high numbers of interactions and communications can take place. Quality interactive communication and interaction in a discussion board can occur through facilitation of learners' engagement and participation (Quinsee and Hurst, 2004; Barab et al., 2001). Communication forms in the Blackboard discussion board can

vary thus offering alternatives to linear communication such as question and answer, with various learning activities, such as informal and reflective learning, and dynamic interaction and community-based learning. All can be included to align with desired learning objectives. Furthermore, a discussion board allows collaborative work to be conducted and reduces the sense of alienation for learners who are studying at a distance (Laurillard, 2002). Furthermore, various internal and external communication media and tools have to be arranged to create an effective, cohesive, and continuous communication arena in order to relate to the learning objectives and expected student participation. Blackboard can be designed toward activity-oriented or communication-driven or mixed forms combined with one another, so designing a discussion board can be equivalent to weaving a whole unit from the viewpoint of interactive communication.

The following table I shows how design education features can be functionalised as a communication form in a discussion board format. Various forms and functions of communication can be embedded in the discussion board by considering various interactions and communications between learners and learning content and instructor in design education. Furthermore, additional media or tools can be combined into the discussion board to enhance interactive communication.

Table I Communication forms in the discussion board of VLE for design education (revised from Park's 'Design education being transformed into Communication forms in the discussion board' (2008b))

| **Design Education Features** | **Communication forms in the discussion board** |
|---|---|
| Authentic task | Presentations of development process and feedback |
| Reflective in action | General discussion and issues, debate while conducting a project |
| Peer discussion | Peer review or feedback |
| Regular consultancy | Feedback and critiques from teachers or designers |
| Demonstration | Teacher's demonstration of a specific technique or skill by request |
| Collaborative works | Group discussion and work area including file exchange and wiki function |
| Visual assessment | Critiques or rating activities |

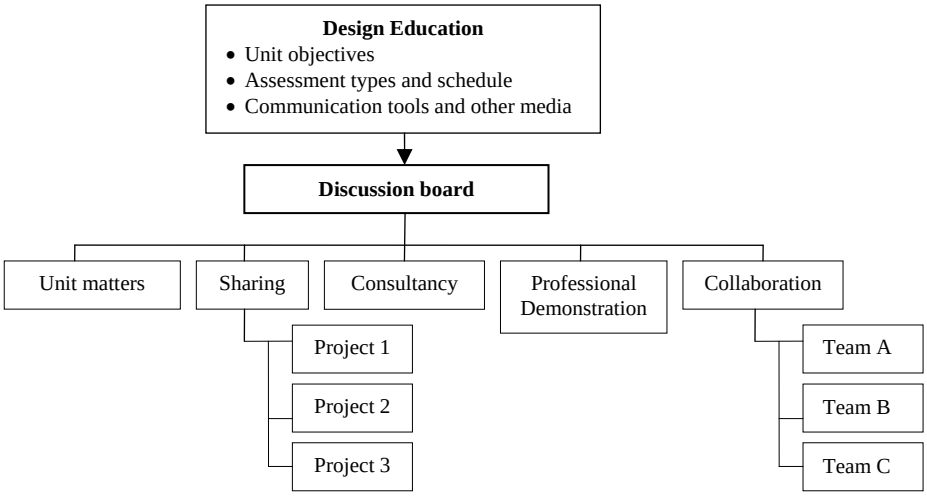


Figure 2 Discussion Board Structure (Revised from Park's 'Proposed Framework of Discussion Board for Visual Design Learning' (2008b))

Figure 2 above shows how a possible communication structure for Blackboard in terms of creating an interactive communication arena for design education teaching and learning. There are also a number of diverse variables that determine a mapping of the discussion board that need to be taken into consideration. These include the peculiar characteristics of design education, unit objectives, project types and schedule, and communication tools and other media. In particular, communication tools, such as statistics and surveys, and other mediums, such as blog and wiki, have to be considered as an effective communication and a pedagogically sound methodology. In addition, the teacher needs to provide regulations or instructions for participants in terms of building up a productive learning community.

***- Interactive Learning Evaluation***

Conventional teaching and learning evaluation is built on teacher performance, artefacts and student attitude. It may not be appropriate to evaluate online learning experience. In other words, the conventional evaluation questionnaire may not be

fully capable to encompass the interactive learning experience so that the result may not be helpful in terms of improvement of online learning and teaching. Therefore, an evaluation of an online unit via Blackboard needs to be designed from the concept of the interactive online learning experience that has already been formulated and structuralised as an interactive learning site and communication channel. 'The technology used in instruction is integral to the teaching and learning' (Harrington and Reasons, 2005: p 7), and the teaching performance and student attitude have been absorbed in the interactive learning environment so that the learning experience should be evaluated based on the framework of the learning site.

As the framework of the interactive learning site has conceptualised the interactive learning experience based on the learning components such as characteristics of design education and learning objectives, so the learning evaluation has been developed from the framework of Blackboard site and conducted as a part of the learning experience. Table II below presents the questionnaire for the Blackboard-based learning evaluation. Question 5 is asking about the overall satisfaction with the learning experience, and Question 6 is an open-ended comment. In particular, Questions 1 to 4 reflect the four components of the Blackboard site that can be extended to evaluate specific components in detail. The four component-based questionnaires are designed based on a five-point Likert Scale in terms of evaluating their levels of interactive learning.

Table II VLE-based Learning Evaluation questionnaire

| |
|---|
| **Q1** How would you rate the Unit Information (UI) of the unit? CI includes Unit profile, Assignment, Proposed weekly study schedule and Staff information. |
| **Q2** How would you rate the Learning Content (LC) of the unit? LC includes Lecture Note, Tutorial Note, Workshop and Weekly Projects. |
| **Q3** How would you rate the Interactive Communication (IC) of the unit? IC includes Discussion board, Email, Telephone and Announcement. |
| **Q4** How would you rate the Supplementary Functions (SF) of the unit? SF includes Assignment submission, Student gallery and relevant resources. |

**Q5** Overall, how would you rate your learning experience in this unit?
**Q6** Please give us any feedback or suggestions for how best to meet your needs. (If possible, add your comments based on the four components – UI, LI, IC and SF)

After completion of email request-based unit evaluation by the university, the Blackboard-based Learning Evaluation was undertaken in the two units which adapted the framework of Blackboard-based design learning proposed above. The student response rates for each unit were 61.90 percent (13/21) and 56.25 percent (13/32) respectively and these rates are much higher than the unit evaluation committed by the university (4.76 percent and 1.25 percent respectively). As Table III below shows, the overall satisfactions of their learning experiences in the units are positive that more than 90 percent of the respondents chose either Scale: 5 Strongly Agree or Scale 4: Agree (Q1 - 5). There were some written comments left that all of them were positive feedback to the units (Q6).

Table III VLE-based Learning Evaluation results

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Digital Design and Communication (n = 13) | Scales | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 |
| | 5 | 5 (38.46%) | 6 (46.15%) | 7 (53.84%) | 8 (61.53%) | 6 (46.15%) | 10 (76.92%) |
| | 4 | 7 (53.84%) | 5 (38.46%) | 5 (38.46%) | 4 (30.76%) | 6 (46.15%) | |
| | 3 | 1 (7.69%) | 1 (7.69%) | 0 | 1 (7.69%) | 1 (7.69%) | |
| | 2 | 0 | 1 (7.69%) | 0 | 0 | 0 | |
| | 1 | 0 | 0 | 1 (7.69%) | 0 | 0 | |
| Design Perspectives (n = 18) | Scales | Q1 | Q2 | Q3 | Q4 | Q5 | Q6 |
| | 5 | 9 (50.00%) | 10 (55.55%) | 10 (55.55%) | 11 (61.11%) | 11 (61.11%) | 11 (61.11%) |
| | 4 | 9 (50.00%) | 7 (38.88%) | 7 (38.88%) | 7 (38.88%) | 6 (33.33%) | |
| | 3 | 0 | 1 (5.55%) | 1 (5.55%) | 0 | 1 (5.55%) | |
| | 2 | 0 | 0 | 0 | 0 | 0 | |
| | 1 | 0 | 0 | 0 | 0 | 0 | |

These results indicate that the learning evaluation and its conducting method can be used with an extended form and supports the argument that an evaluation for an online learning should be designed as a part of learning activities and a communicative form within the learning site. Furthermore, it is also proving a high possibility that the proposed framework of Blackboard-based design learning can be

applied and extended to other design units.

## Conclusion

The benefits of online learning are its flexibility, accessibility and interactivity that enable students to access learning materials and services from anywhere and at anytime. To create an effective and interactive learning experience via Blackboard for design education, an integrated framework of design learning including an interactive communication structure and learning evaluation, were proposed based on understandings of online learning, Blackboard systems and design education. The framework was applied to two graphic design units from a design education course and the results of the learning were evaluated. The results of this evaluation indicate that online design education can be integrated with various traditional educational values and features in a systematic manner. What is required is the design of its evaluation of the student learning experiences as a learning activities and a communication form of the online learning site. The learning evaluation should reflect the site structure and relevant functions, so it allows attracting more students to participate in the evaluation. Furthermore, there are various types of interactions in online learning environments that are required to be visualised and functionalised appropriately within Blackboard systems and its interfaces to embody the unit objectives. Consequently, designing a Blackboard-based learning site refers to creating an interactive learning experience by considering, defining and arranging diverse interactions and communications among the learning constituents (learner, instructor and content) and Blackboard systems and its interface in order to tailor the site to the student needs and learning objectives .

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